DOCUMENT RESUME

ED 259 008 TM 850 377

AUTHOR Knuckle, Essie P.
TITLE A Culturally Sensitive Approach to the Interpretation of Performance of Black Adolescents on Selected Neuropsychological Tests.
PUB DATE 26 Apr 84
NOTE 18p.; Paper presented at the Annual Meeting of the American Educational Research Association (68th, New Orleans, LA, April 23-27, 1984).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Adolescents; Age Differences; Black Attitudes; Black Culture; *Black Students; *Cultural Differences; Diagnostic Tests; Handicap Identification; Intelligence Tests; Junior High Schools; *Neurological Impairments; *Perception Tests; Performance Tests; *Racial Differences; Sex Differences; Tactual Visual Tests; *Test Bias; Testing Problems; Test Interpretation; Test Norms
IDENTIFIERS Benton Visual Retention Test; Black Ideology Scale; Purdue Pegboard Test; Symbol Digit Modalities Test; Wechsler Intelligence Scale For Children (Revised)

ABSTRACT

Normal black adolescents were given neuropsychological tests of brain damage, and the interpretation of these tests was reviewed with respect to culturally relevant data. Subjects were 50 male and 50 female black students, aged 12-13, with no history of central nervous system trauma, and average scores on the Wechsler Intelligence Scale for Children-Revised (WISC-R). The Black Ideology Scale (BIS) was used to measure social, cultural, and ethnic identity according to Black Nationalist Ideology. The Symbol Digit Modalities Test (SDMT), Benton Revised Visual Retention Test (BVRT-R) and the Purdue Pegboard Test (PPT) were also administered. Using multivariate analysis of variance and multiple regression analysis, significant sex differences were found on SDMT and PPT results. An interaction was found between sex and ethnic identity on the SDMT. Interactions were also found between sex, age, and BIS scores on BVRT-R scores. WISC-R scores were predicted by PPT, BVRT-R, and BIS scores. There were problems with the previously published norms for the BVRT-R and the PPT. The SDMT gave the most accurate classifications for this sample. Some cultural characteristics affected responses to certain items. In conclusion, interpretation of neuropsychological test results with black adolescents would have more ecological validity if a culturally sensitive approach were used. (GDC)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED259008

A CULTURALLY SENSITIVE APPROACH TO THE INTERPRETATION OF PERFORMANCE OF BLACK ADOLESCENTS ON SELECTED NEUROPSYCHOLOGICAL TESTS

ESSIE P. KNUCKLE, Ph.D.
HOWARD UNIVERSITY
DEPARTMENT OF PSYCHOEDUCATIONAL STUDIES
WASHINGTON, D.C. 20059

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Knuckle, Essie P.

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
✓ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

TM 850377

This paper is being presented at the American Educational Research Association meeting April 26, 1984.

A CULTURALLY SENSITIVE APPROACH TO THE INTERPRETATION OF PERFORMANCE OF BLACK ADOLESCENTS ON SELECTED NEUROPSYCHOLOGICAL TESTS

The purpose of this brief presentation is twofold. Initially, the paper describes the test results of "normal" black adolescents on selected neuropsychological tests designed to discriminate between persons with and without brain damage. Secondly, it is argued that the interpretations made of the test results and the misclassifications which result when these selected neuropsychological tests are used with black adolescents are based on assumptions, theories, and research which exclude the use of culturally relevant data. Conversely, if there is an inclusion of culturally relevant information, the interpretations of the test data are more appropriate and less detrimental for the adolescents.

The use of selected neuropsychological tests to assess brain and be-relationships was suggested by researchers like Rourke (1979) who defined neuropsychological assessment as:

> Any procedure which has as its aim the elucidation of the relationships between the state of the brain and behavior. In some instances, the particular testing rubric in question may be weighted more in the direction of those techniques which are typically seen as neurological; in other instances, the procedures may be more clearly identifiable as tests which are psychological in nature (p. 89).

In the assessment of black adolescents it was clear that the focus was on whether the tests clearly elucidated the relationships between the brain and behaviors. The behaviors that were focused on are what are known as the adaptive abilities of these students. Adaptive abilities were defined by Townes, Trupin, Martin, and Goldstein (1980) as:

> Higher order brain functions (e.g., intelligence, concept formation, complex perceptual skills, and memory) and lower order brain function (e.g., motoric and sensory-perceptual skills) as measured by neuropsychological assessment (p. 675).

It was easy to find tasks that assessed both higher and lower level cognitive functions. Although many tasks combine these functions and complicated the issue of elucidating the relationships between the state of the brain and behavior, none of the tests selected included information that explained the relationships of culture, brain function, and the adaptive abilities. It is widely accepted that behavior and cognitive response style are greatly predicated on one's cultural experience (e.g. Cole, 1971; Cohen, 1969; Hale 1982; Shade, 1982). Therefore the ecological validity of neuropsychological tests as well as other psychological tests are called into question if cultural experiences are not considered in the interpretations. By ecological validity, I am referring to the ability of a test to predict the behavior of an individual in a wide variety of contexts and emotional situations.

Tucker (1981) described ecological validity as follows:

> For neuropsychological approaches to information processing to have ecological validity, to developments that are meaningful in the context of everyday experience and behavior, it is necessary to consider emotional phenomena. The human organism is not a closed-loop data processor but a creature whose cognition is subject to activation and direction by motivational processes (p.19).

With these considerations in mind three neuropsychological tests were selected to assess the brain behavior of black adolescents. These tests were the Benton's Revised Visual Retention Test, the Symbol Digit Modalities Test, and the Purdue Pegboard Test of manual dexterity.

Selection of specific instruments in the battery was based on the principles suggested by Smith (1975). Smith's rationale stated that there were two basic principles useful for selecting comprehensive tests that measured a wide range of higher and lower level cerebral functions. The two principles are: (a) the tests should include standardized and objective measures of a broad range of language, verbal and nonverbal reasoning, auditory and visual memory functions; and (b) the tests should be selected so as to permit differentiation of the sensory and motor modalities involved in perception and execution of the tasks (or lower level functions) that they were designed to measure.

In this research particular attention was devoted to visual memory tasks because of the constant claims of visual perceptual deficits in blacks (e.g., Amante, Van Houten, Grieve, Bader, & Margules, 1977; Tyler, 1956) at higher cognitive levels. An additional examination of lower level cerebral functions in the sensory motor modality was also done to help explain and clarify the higher cerebral functions. This study examined the effects of sex, age, measured ethnic identity, and the interactions on various scores from the selected neuropsychological tests.

Method

The subjects in this study were 100 right handed, black (50 male, 50 female) students aged 12 and 13, from southeastern Virginia. Subjects selected for the study met the following criteria: (a) each student had an earned WISC-R Full Scale IQ score between 85-115 $\pm$ 6 (mean 99.52); (b) each student spent only one year in each grade and had received passing grades

in all courses for the school term; (c) and each student had no reported history of CNS trauma. Details of the method and procedures employed in the study are outlined elsewhere (Knuckle, 1983). All students were also given the Black Ideology Scale as a measure of social cultural ethnic identity.

Description of the Instrumentation

The various tests and the scale used in the investigation were as follows: Wechsler Intelligence Scale for Children-Revised (WISC-R, Symbol Digit Modalities Test (SDMT), Benton Revised Visual Retention Test (BVRT-R), Purdue Pegboard Test (PPT), and the Black Ideology Scale (BIS). The WISC-R is a traditional tool for measuring int[illegible]nce. The SDMT developed by Aaron Smith was based on principles (Smith, 1973) put forth as follows:

> It is now well established that the perception of numbers and other meaningful verbal symbols involves different cerebral hemispheric mechanisms than those involved in the perception of non-verbal visual designs. Despite continuing controversies on the specific location of such mechanisms within each hemisphere, it is widely accepted that as the brain matures in normal children and adults, the left hemisphere plays a "leading" but not exclusive role in "processing" language symbols; in speaking, writing and reading, and to a lesser extent, in understanding speech. The right hemisphere plays a similar "leading" role in visual-perceptual, spatial-constructional and nonverbal reasoning functions. Thus, the simple processes of substituting numbers for geometric designs in written and oral responses test the efficiency of many different cerebral mechanisms in the two hemispheres. Although written and oral substitutions are simple responses, they are the end product of the intergration of many complex neurophysiological processes underlying visual, motor, speech, and mental functions (p. 1).

On the (SDMT), the subject is required to substitute a number for randomized presentations of geometric figures. He or she is given exactly 90 seconds to complete as many of the 110 items as possible. The procedure is done for both the written and oral presentation. According to the manual

if both written and oral retest scores are more than one standard deviation below the age-sex norms, the child should be referred for more detailed neuropsychological studies.

The Benton Revised Visual Retention Test (BVRT-R) (1974), "is a clinical and a research instrument designed to assess visual perception, visual memory, and visuoconstructive abilities" (Benton, 1974, p. 1). Form C, which consists of ten designs (each of which may contain one or more figures), was used in the investigation. The Benton Administrations A and C were scored for the Number Correct Score and for the Error Score. Administration A consisted of exposure for 10 seconds followed by immediate reproduction from memory. Administration C required that each design be copied by the subject while the design was in view.

The Purdue Pegboard Test is a test which requires the subjects to insert pegs for 60 seconds, one at a time, as rapidly as they can, in a column of holes in a pegboard, starting with the preferred hand. Subjects are then told to repeat the same task with the nonpreferred hand, and then with both hands, simultaneously. The examiner has only to record the number of pegs that are correctly placed in 30 seconds and 60 seconds.

The Black Ideology Scale (BIS) was designed by Terrell and Taylor (1978) as a measure of four domains and twelve subdomains of Black Nationalist Ideology. Terrell and Taylor stated that "The BIS could serve as a technique to provide more precise descriptive information about the nature of attitudinal differences in the black population." The authors of the BIS also envisioned the inventory as having potential use as a means of providing information on the behavioral correlates of individual differences in ide-

ological orientation. For example, the BIS can be used to estimate the extent to which school performance relates to one's black ideological orientation as measured by the scale. The scale contains 112 items and responses are recorded on a Likert type scale. High and low levels of the BIS scores were determined by whether subjects were above or below the mean for the sample group. Those above the mean were considered as the high group and those below the mean were considered as the low group.

Results

The test results were analyzed using multivariate analysis of variance and multiple regression analysis. The multivariate F test indicated that there were significant differences between black male and female students on higher and lower cortical level tasks as measured by the SDMT and the Purdue Pegboard Test. The univariate results were: SDMT-W F (1, 55) = 11.37, $p < .001$; SDMT-O F (1, 55) = 9.74, $p < .003$; and the PPTBTR F (1,55) = 5.69, $p < .021$. The SDMT-W showed means of 47.60 for female subjects and 42.80 for male subjects. The SDMT-O mean scores were 55.08 and 48.96 for female and male subjects respectively. On the (PPT) administration utilizing both hands simultaneously, the mean scores were 10.46 and 9.72 for female and male subjects respectively. Consequently, the published normative data for the PPT (both hands) by Costa, Vaughan, Levita, and Farber (1963) misclassified 28% of the black adolescents in the sample. Of this total, 40% of the misclassifications were for male subjects.

When the interaction effect for sex by ethnic identity score was examined, there was a significant univariate F value on the SDMT-W score. The F (1, 55) = 4.30, $p < .043$. The nature of the interaction was such that high scoring male

subjects on the BIS scored lower than female subjects on the SDMT-W with a mean of 43.66. For female subjects who were in the same category the means was 46.08 on the SDMT-W The same type of results were obtained for the low scoring group on the BIS, with male subjects the mean was (41.78) and the mean for the female subjects was (49.12). However, female subjects in the low BIS group tended to make higher SDMT-W scores than females in the high BIS group. Male subjects made higher SDMT-W scores as their BIS scores increased. This resulted in an ordinal interaction.

These results substantiate the findings reported by Smith (1982), that female subjects perform better on this task than male subjects. The results suggest further that female subjects perform better than their male counterparts whether they are in a high ethnic identity group or a low ethnic identity group. It was also observed for female subjects that the higher their ethnic identity score the lower their performance was on the SDMT-W. Male subjects in the high ethnic identity group tended to make better SDMT-W scores than male subjects in the low ethnic identity group.

Another analysis was done to establish the difference in performance of the high scoring BIS subjects and the low scoring subjects without regard to sex. The results indicated that there was a significant univariate F (1,55)= 4.52, $p < .038$ for the PPT score for the right hand administration for 30 seconds. Means were 13.55 and 13.16 for the high and low groups, respectively.

Moreover, when the high and low BIS scoring subjects were examined using the multivariate analysis of variance on the Benton Error Scores there were several significant univariate F values for Total Error Score F (1, 92) = 4.61, $p < .034$; Distortion F (1, 92) =5.33, $p < .023$; and Total Right Error Score F (1, 92) = 9.18, $p < .003$. All of the above information must be interpreted

using the additional knowledge that the BVRT-R (when scored for Number Correct Score) misclassified forty percent of the total sample.

In a multiple regression analysis for predicting the WISC-R Full Scale IQ using the neuropsychological scores, the PPT with both hands was the best predictor. The correlation was .391 which accounted for 15% of the variance in the criterion variable. The BVRT-R Number Correct Score for Administration (A) was entered on the second step. The multiple R at that step was increased to .473 and accounted for 22% of the variance in the criterion variable. The Black Ideology Scale score was entered on the third step in the regression analysis. The variables entered up to that point had a multiple R of .494 and accounted for 24% of the variance in the WISC-R Full Scale IQ.

In addition, on the BVRT-R both scoring systems indicate that there are significant differences between persons' scores on the BIS and their performance on the BVRT-R especially when scored for errors. It is true that the subjects earned lower Number Correct Scores and higher Error Scores than the normative group, but there is a correlation between the variables. The Total Error Scores are derived from the cards that had Number Correct Scores of zero, meaning that the card had one or more scorable errors. Also, this test misclassified too many (40%) of the subjects in the sample. If Total Errors, Distortions, and Right Errors distinguish between the high and low Bis scores, then one's ethnic identity is definitely an important factor to be taken into account. Further analysis also demonstrated that 12 and 13 year old high and low BIS scorers had a significant difference between their performance on Size Score on the BVRT-R $F(1, 92) = 4.24$, $p < .042$. When the interaction of sex, age levels, and high and low BIS were examined for their effect on Benton scores, the BVRT-R Administration (C) Number Correct Score and the Error Copy Scores showed

significant univariate F (1, 92) = 7.31, $p < .008$ and F (1, 92) = 8.56, $p < .004$ respectively.

A Culturally Sensitive Approach to the Interpretation of the Test Results

In interpreting the results of any test, certain assumptions are made and certain rules are followed. As Lutey (1977) explains, the interpretation of psychological test results must include meaningful discussion and analysis, A psychologist should not interpret the results based solely on the test scores. Other factors about the examinee must be included to make the interpretation meaningful and appropriate.

Each neuropsychological test makes certain claims and assumptions about its ability to distinguish between persons who have cerebral injury. But how accurate is the test in discriminatir j between the people who do not have a history of brain damage? For example, the Benton Revised Visual Retention Test manual has a claim in it that states that about 15% of normal children of average intelligence in the standardization group had scores which were classified as either borderline or defective. However, when black adolescents with normal measured intelligence were given this test, 40% received scores at the borderline or defective level. The assumptions given in the manual are: (a) if you score two points below the Number Correct Score the question of a specific disability is raised; (b) any obtained score which is three or more points below the expected score may be considered to suggest such a disability.

Does the interpretation of suggested brain damage or labelling a child as having the disabiltiy make an sense after it is empirically observed that this particular test misclassifies 40% of the normal black adolescents who have no

history of CNS trauma? Some alternative interpretations are suggested and some additional assumptions need to be made. Several questions emerge, first of all, how many black subjects were included in the standardization sample? The manual does not provide this information. If we assume that there were some , what were their performances like on the tests? Are the black subjects' responses in this sample like those blacks or are they different? Since the Number Correct Scores are lower for the sample group of normal black adolescents than for the normative group, what may be some of the causes of the differences?

At this point a closer analysis of the neuropsychological test must be made. The technical aspects of the test having been considered, this researcher then examined the types of errors that were being produced and found that black male and female subjects were scoring significantly different on Distortion and Rotational Errors. Yet Benton asserted that there was no need for separate norms for male and female subjects. This assumption is obviously not true for black subjects. Moreover, two significant interact effects were found among the sexes, levels of ethnic identity, and age groups 12 and 13. In addition, subjects who differed in their levels of measured ethnic identity scores showed significant differences in the performance on three of the Benton error scores. This comparison means that subjects with high and low BIS scores could be expected to perform differently on these tasks. It is quite possible that the Benton Revised Visual Retention Test could better be interpreted if it were considered in relation to age,sex, ethnic identity score, and Full Scale IQ Score. All of these variables appear to be important factors in interpreting the performance of black adolescents on this neuropsychological test.

The Purdue Pegboard, a test of manual dexterity is also used by many researchers to examine the laterality of the brain. Costa et al. (1963) and

Fernald, Fernald, and Rines (1966) demonstrated good hit rates or correct classifications for the PPT. Fernald et al. (1966) said that the overall accuracy averaged about 72% for the test. Remember that this is a statement only about how accurate the test is in correctly identifying people who do have brain damage. But how many people will it falsely identify: For this study sample of black adolescents, when using the normative data of Costa et al.(1963), fifty two percent of the sample was misclassified on the right, left, or both hands. Again, there was no way to determine if black subjects were included in the samples and what their performances were like on this thirty second task. When additional normative information by Gardner and Broman (1979) was used to interpret these data a higher percentage (66%) of misclassifications occurred.

It is quite obvious that if the normative data for these two neuropsychological tests had included the performance of black and other minority groups in the standardization samples the means and the cut scores would have been different. The performance of black adolescents on this test was quite different from what is stated in theories about nonverbal performances of blacks. The study sample of black adolescents did not find this nonverbal test to be as nonthreatening as reported in the literature. In observing the subjects, a great amount of anxiety was produced with the presentation of the task. Many subjects were not sure they could perform on a test that did not require paper and pencil. Also after the initial trial, subjects appeared bored with the repetitiveness of the task with the nonpreferred hand and the simultaneous production. It is possible that the "verve" that Boykin (1979) describes is lacking when this task is presented to black adolescents. Furthermore, although this is a

nonverbal task, it appears to be more culturally loaded than some of the language tests. Anastasi (1982) also reported that there was a growing body of evidence suggesting that nonlanguage tests may be more culturally loaded than language test. The results of this study partially substantiate this assertion.

The SDMT written and oral tests resulted in the most accurate classifications of these black adolescents. The written test resulted in only three percent of the sample being misclassified and the oral test resulted in four percent of the sample being misclassified. In the sample, the oral mean performance for the group was significantly better than the normative data for the standardization group, yet there were some students who performed at a very slow rate. The rate of performance demonstrated an element of respect for authority involved in the response style. For example, a number of students were observed stopping or slowing down on the oral task in order to allow the examiner time to write the responses. The students' concern for the examiner's need to record the responses was not necessary, but this is a typical example of the cultural expectation of black students and their interaction with adults.

A closer examination of the observation data on the three neuropsychological tests resulted in a clearer understanding of what cultural responses were entering into the test results. On the BVRT-R, what some researchers have called interference appears to be creativity and an emotional feeling for the designs. For example, while reproducing the designs, black adolescents gave the designs names of familiar objects and then proceeded to draw the designs as they verbalized them. The more creative the design became the more distortion errors scored. Also, these subjects found card number seven to be about as difficult as card number ten. Yet, they did not lose their motivation to complete the task when confronted with this difficult card so early in the test. Moreover,

the two beginning figures were easily distorted because of the improper names that the subjects gave to the designs.

These additional observations are valuable in making meaningful interpretations of neuropsychological as well as other psychological tests. In summary, this researcher would conclude that knowledge of the test is important, observational data are essential, technical construction of test must be analyzed, different normative data compared, and finally interpretation should be made with knowledge of the examinees cultural background and measured ethnic identity. With these factors in mind the psychologist will be able to produce a more meaningful interpretation and a large complement of black students will not be falsely misclassified as having CNS trauma when they have no history of such trauma.

Summary and Conclusions

During the last two decades school psychologists have been reporting data to the schools, supposedly about the relationship of the brain and the behavior of black students. Within the last few years, legislation has mandated clearer explanations of assessment data.

In summary, this paper has reviewed the state of the art of neuropsychological assessment with black adolescents and possibly other minorities too. The current practice of relying on test results to infer brain functions without the inclusion of cultural data is problematic with neuropsychological tests as well as with other psychological tests. Several neuropsychologists have suggested that researchers include culture or ethnicity as a necessary variable in interpreting neuropsychological assessments (Adams, Boak,& Crain, 1982; Knuckle & Campbell, 1984; Luria, 1973; Parsons & Prigatano, 1978).

Even though neuropsychologists and school psychologists have demonstrated a growing interest in neuropsychological assessment, there is a need for more intense study of the superficial methods suggested for examining the brain behavior correlates of black students. The comparison of normative data, patterns of performance, right-left difference, and pathognomonic signs will not lend themselves to appropriate and accurate neuropsychological assessment and interpretation until students' cultural experiences are included in the interpretation of the test results.

In conclusion, interpretations of neuropsychological test results with black adolescents would have more ecological validity if the psychologists would use a culturally sensitive approach. I agree with Asa Hilliard, Janice Hale, Barbara Shade, and Wade Boykin, to name a few of the researchers who would examine the different approaches and different interpretations of one's environment and experiential backgrounds that black or Afro-American students bring to any testing situation. Without at least an attempt to incorporate the cultural experiences into the interpretation of the neuropsychological assessment of blacks, neuropsychologists as well as other psychologists have only numbers earned on tests. The truth of the numbers is still to be unraveled, and to understand and explain the numbers one must first have a nondistorted knowledge base about the thriving black culture and experiential backgrounds of black students. Without this knowledge base, neuropsychologists and other psychologists are going to continue to misdiagnosis and misclassify "normal", bright, and vibrant black children.

References

Adams, R. L., Boak. C., & Crain, C. (1982). Bias in a neuropsychological classification related to education, age, and ethnicity. Journal of Consulting and Clinical Psychology, 50, 143-145.

Amante, D., Van Houten, V. W., Grieve, J. H. Bader, C. A., & Margules, P. H. (1977). Neuropsychological deficit, ethnicity, and socioeconomic status. Journal of Consulting and Clinical Psychology, 4, 524-535.

Anastasi, A. (1982). Psychological testing. New York: Macmillan Publishing Company, Inc.

Benton, A. L. (1974). Revised visual retention test: Clinical and experimental applications (4th ed.). New York: The Psychological Corporation.

Boykin, A. W. (1979). Psychological/behavioral verve: Some theoretical explorations and empirical manifestations. In A. W. Boykin & J. F. Yates (Eds.) Research directions of black psychologists. New York: Russell Sage Foundation.

Cohen, R. (1969). Conceptual Styles, culture conflict and nonverbal tests of intelligence. American Anthropologist, 71, 828-856.

Cole, M., Gay, J., Glick, J. A., Sharp, D. W. (1971). The cultural context of thinking and learning. New York: Basic Books.

Costa, L. D., Vaughan, H. G., Levita, E., & Farber, N. (1963). The Purdue pegboard as a predictor of the presence and laterality of cerebral lesions. Journal of Consulting and Clinical Psychology, 27, 133-137.

Fernald, R. D., Fernald, P. S., & Rines, W. B. (1966) Purdue pegboard and differential diagnosis. Journal of Consulting Psychology, 30, 279-288.

Gardner, R. A. & Broman, M. (1979). The Purdue pegboard: Normative data on 1334 school children. Journal of Clincial Child Psychology, Fall, 156-162.

Hale, J. E. (1982). Black children their roots, culture, and learning styles. Provo, UT. Brigham Young University Press.

Knuckle, E. P. (1983). An alterrative framework for interpreting the performance of black adolescent students on neuropsychological tests: A functional analysis. Unpublished Doctoral Dissertation, Howard University, Washington, DC.

References, (continued)

Knuckle, E.P. & Campbell, A.L. (1984). Suitability of neuropsychological test norms with black adolescents. Paper presented at the Twelfth International Neuropsychological Convention, February, 1984, Houston, TX.

Luria, A.R. (1973). The working brain. London: Allen Lane, The Penguin Press.

Lutey, C. (1977). Individual Intelligence Testing: A Manual and a Sourcebook (2nd ed.) Greely, CO: Carol L. Lutey Publishing.

Parsons, O.A. & Prigatano, G. P. (1978). Methodological consideration in clinical neuropsychological research. Journal of Consulting and Clinical Psychology, 46, 608-619.

Rourke, B.R. (1976). Issues in neuropsychological assessment of children with learning disabilities. Canadian Psychological Review, 17, 89-102.

Shade, B.J. (1982). Afro-American cognitive style: A variable in school success? Review of Educational Research, 52, 219-244.

Smith, A. (1973). Symbol digit modalities test. Los Angeles, CA; Western Psychological Services.

Smith, A. (1975). Neuropsychological testing in neurological disorders. In W.J. Friedlander (Ed.) Advances in Neurology. New York: Raven Press.

Smith, A. (1982). Symbol digit modalities test manual revised. Los Angleles, CA. Western Psychological Services.

Terrell, F., & Taylor, J. (1978). The development of an inventory to measure certain aspects of black nationalist ideology. Psychology, A Quarterly Journal of Human Behavior, 15, 31-33.

Townes, B.D., Trupin, E.W., Martin, D.C., & Goldstein, D. (1980). Neuropsychological correlates of academic success among elementary school children. Journal of Consulting and Clinical Psychology, 48, 675-684.

Tucker, D.M. (1981). Lateral brain function, emotion, and conceptualization. Psychological Bulletin, 89, 19-46.

Tyler, L.E. (1956). The psychology of human differences (2nd ed.). New York: Appleton-Century-Crofts.